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Analytical Approximations

Volume 10

Cecil Hastings, Jr.

James P. Wong, Jr.

P-397

16 April 1953

The RAND Corporation
SANTA MONICA • CALIFORNIA

3-27-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .00005 over $(0,\infty)$,

$$e^{-x}I_0(x) \doteq \sqrt{\frac{1 + .302x + .234x^2 + .114x^3}{1 + 2.2979x + 2.3871x^2 + 1.2032x^3 + .7183x^4}}$$

Cecil Hastings, Jr.
James P. Wong, Jr.
RAND Corporation

4-3-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .0001 over (0,2),

$$e^{-x}I_0(x) \doteq \frac{1 + .1693x + .0844x^2}{1 + 1.1665x + .5247x^2} .$$

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James P. Wong, Jr.
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4-8-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .000,009 over (0, 1),

$$e^{-x}I_0(x) \doteq \frac{1 + .0302x + .0889x^2}{1 + 1.0299x + .3728x^2}.$$

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James P. Wong, Jr.
RAND Corporation

4-9-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .0007 over (0,4),

$$e^{-x}I_0(x) \doteq \frac{1 + .4537x + .0955x^2}{1 + 1.4387x + .8855x^2} .$$

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James P. Wong, Jr.
RAND Corporation

4-13-53

Analytical Approximation

Bessel Function of Imaginary Argument: To better than .0003 over (0,4),

$$e^{-x}I_1(x) \doteq \frac{.4935x + .0268x^2}{1 + .9667x + .5373x^2} .$$

Cecil Hastings, Jr.
James P. Wong, Jr.
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